mal membranes—and consequently would not readily escape from the blood-vessels, notwithstanding the fact that they are held in solution in the circulating fluid. On the other hand, the passage of the tetanus antitoxin into the mother's milk would indicate a continuous supply, otherwise the immunity of the mother would soon be lost. Further experiments are required to settle this question in a definite manner, and also to determine the exact source of the antitoxins in the animal body and the *modus operandi* of their production.

GEO. M. STERNBERG.

WASHINGTON.

REMARKING THE MEXICAN BOUNDARY.

MR. A. T. MOSMAN, assistant in the U. S. Coast and Geodetic Survey, one of the commissioners on the part of the United States, presented an interesting summary of the work at a meeting of the National Geographic Society in Washington on the 8th inst.

At the initial meeting of the commissioners for the two countries, it was agreed that any of the old monuments recovered should be taken as defining the line; that new monuments should be interpolated between them, so that no two monuments should be more than 8000 metres apart, as required by the new treaty. The line had been marked under the treaty of 1853, by 52 monuments; the commissioners found 38 of these standing in 1891. On the parallels the new monuments mark the curve of the parallel, but on the oblique lines the monuments recovered were not accurately located on the line joining their extremities, and the boundary on these lines as now marked is, therefore, a broken line. Old monuments were recovered at all important points on the boundary, including all points where the line changed direction, but the distances between them were unequal, and in one instance exceeded 100 miles. The line from El Paso on the Rio Grande to San Diego on the Pacific, 700 miles, is now defined by 258 monuments.

The field work required the redetermination of the geographic positions of the old monuments recovered, and presents some interesting comparisons showing the facility and certainty of modern methods. The longitudes of the old monuments were determined by Emory from transits of the moon and moon culminating stars. In the relocation the longitudes were determined by the telegraphic method, connected with the geodetic work of the Coast Survey by coast survey parties working in conjunction with the commissioners. The greatest difference developed from Emory's positions was 4′ 34″.3 with other differences of 34″ and 54″ and still smaller quantities showing the old work to have been remarkably good for the method. The latitude stations in the new work were about 20 miles apart over the whole line, and at each station an azimuth was observed on Polaris near elongation to start the direction for the new tangent for the parallel and check the tangent ending at the station. The latitude observations were made with the zenith telescope formerly used on the N. W. boundary, but improved with new micrometer and levels. The telescope has a focal length of 826 mm., and the objective a clear diameter of 67 mm. A new departure was made in mounting the instrument on a wooden pier constructed in a simple form, readily transported. Its stability proved as great as a brick or stone cemented pier, as it was not uncommon to secure a whole night's work without relevelling, and the instrument invariably remained for several hours with level correction less than one div.=1″.28. The probable errors of the latitude determinations from the U. S. observers = ± 0″.03 to 0″.4. The Mexican observations have not yet been received. The plan of operations agreed upon required

independent determinations by the representatives of both governments. This was not practicable in the longitude determinations, but in the latitudes, running the parallels and locations of the numerous monuments, it was strictly carried out. The mean difference in the location of the 258 monuments, was less than three-tenths of a metre; the maximum difference was only 1.8 m., which occurred in locating a point about midway between two old monuments 100 miles apart, and over a very rough mountainous country, where the distances between water holes was over 60 miles. The angular variations of the lines run by the two parties at this point was a little more than three seconds.

The final results from the astronomical observations were required for immediate use on the ground; to permit the computations the mean declinations for the stars for latitude had been furnished by Professor T. H. Safford, of Amherst. In this way the latitude and azimuth were always available within three or four days after the observations were completed, a feature of such work that, it is believed, has not heretofore been attempted. Mr. Mosman promises that a list of the stars furnished by Professor Safford, some 600, will be published in the report of the commission, to be available for future work in the same latitude.

In locating the intermediate monuments the commission made use of the stadia, with gratifying results. On the parallel of 31° 47′ for a distance of 100 miles both chain and stadia were used for the purpose of comparison. It was found that the stadia was much more reliable than the chain, even on the desert, and in a rough country was much superior. The whole line was measured by both the American and Mexican engineers independently; when the two results for any distance differed more than one part in 500, remeasurements were made by steel tape or triangulation to discover the error. Many lines determined by triangulation were compared with the lengths determined by stadia, and the results showed that the stadia measurement could be relied on within one part in 1000. One line of 45 miles measured over rolling sand hills differed by one part in 1800 only.

In addition to the astronomical work, a strip of topography was surveyed on the American side 2½ miles wide, and a line of levels was run with the wye level from the Rio Grande to San Diego, giving the elevation of each monument above mean tide of the Pacific Ocean. The levels were checked at Yuma with R. R. levels from San Francisco, showing the infinitismal discrepancy of two hundredths of a metre, probably an accident. At the Rio Grande there is a discrepancy of about two metres, but the datum plane for the R. R. levels at this place is not known. O.

THE NATURE OF SCIENCE AND ITS RELATION TO PHILOSOPHY.

If any one should ask me, 'What is physics?' I would tell him to study in the physical laboratory for ten years and then what he had learned by the time he was through would be the nearest he could get to an answer to the question. So to the question, 'What is science?' I can give no other general answer than that to anyone it is just what he knows about it. I can, however, give as a particular answer what I have in my own experience found science to be.

Science consists of weighing evidence and stamping each statement with an index of its reliability. That the sun moves around the earth is, according to the evidence at present produced, a statement with a reliability of 0. That the earth moves around the sun, we at the present day stamp as certain. That Mars contains living beings is to-day stamped as quite improbable. On the scale of probability where 0 means